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SURGICAL WORK
IN
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SOME IMPRESSIONS OF SURGICAL WORK IN NORTH AMERICA

*BEING OBSERVATIONS MADE DURING A SHORT VISIT
TO CANADA AND THE UNITED STATES IN 1906*

BY

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SOME IMPRESSIONS OF SURGICAL WORK IN NORTH AMERICA.

INTRODUCTION.

THE following account of a visit paid to Canada and the United States in August and September, 1906—the primary object of which was to attend the Annual Meeting of the British Medical Association at Toronto, but the interest of which was much added to by visits to some of the best known surgical clinics in the States—will, I hope, be found of interest to some of my professional brethren.

The general result of the visit was to give the writer a very strong impression that sufficient attention is not, at the present day, given to the advances being made on the American continent in surgical and gynæcological work, if one is to judge from the paucity of references in English general medical journals or in India, where attention is so much fixed on Continental work.

As the object of these notes is not to write an account of the journey from an ordinary traveller's point of view, or to serve as an advertisement of the advantages offered to emigrants to the wonderful agricultural country now being opened up in Western Canada, and as also full reports of the meeting of the British Medical Association have been made so readily available to all in the journal of the Association, notes on the part of my journey spent in Canada, where, after the meeting in Toronto, I visited the Rocky Mountains, nearly traversing the continent through the newly opened up western provinces, will be but brief.

PART I.

CANADA.

THE meeting of the British Medical Association, which was held in Toronto, from Tuesday, August 21st to Friday, August 24th, 1906, was a very pleasant affair; was, on the whole, very well managed, and was of great professional interest. It was especially interesting in the exceptional circumstances of a meeting across the Atlantic allowing of the attendance of very large numbers of the most active and progressive section of the profession in the United States. Invitations had been issued practically to the profession there "en masse," and from 600 to 800 medical men accepted as well as not a few medical women. Country practitioners from the remotest parts of the Dominion of Canada attended in large numbers, and with the 300 medical men who journeyed over from Great Britain, made up the total attendance to about 2,000.

The sections of the meeting which I personally attended were those of gynæcology and surgery. The surgical section was presided over by Sir Hector Cameron, of Glasgow, and at times the large chemistry theatre, in which its sittings were held, was quite insufficient to hold those seeking admission. The papers read in this section were, with but few exceptions, of great interest and importance, and gave rise to very instructive discussions in which the American contingent of surgeons took a very considerable part. The discussions on prostatectomy and on the treatment of septic peritonitis were perhaps the most interesting, the paper introducing the latter subject by Mr. C. J. Bond, of Leicester, we heard spoken of later by American surgeons, who had attended the meeting, in terms of great praise.

The gynæcological and obstetrical section was also well attended, but was hardly managed as well as the surgical section, and the discussions were not kept up with the same spirit, and there was a good deal of wandering from the subject.

The meeting being held in Canada, it seemed to be taken for granted there would be a very small attendance of members interested in tropical medicine and in naval and military medicine, as no sections dealing with these subjects were, as is usually the case, constituted.

Beyond a few papers which were read or taken as read in the section of pathology, there was an entire absence of matter of special interest to those practising in warm climates.

There were but few members of the military medical services at the meeting; four only, I believe, of the Indian medical service. Assistant-Surgeon C. B. Rama Rao, of Madras, who was on his way to Europe, represented the South India branch of the Association officially.

I had not much time for visiting medical institutions in Canada, but it was evident that medical education is well provided for in the McGill College at Montreal, and in the University of Toronto. I visited, however, at Montreal, the newly opened Victoria Hospital. It was built at the expense of the two great Canadians, Lords Strathcona and Mountstephen, and is a magnificent institution, probably hardly equalled elsewhere. Toronto General Hospital as a building is a little behind the times, but is to be rebuilt.

On completion of the proceedings of the British Medical Association Meeting, in company with a surgeon practising at Plymouth, I started on a rapid journey to the Rocky Mountains by the Canadian Pacific Railway route, a distance of 2,400 miles from Montreal and nearly as much from Toronto. The route taken was from Toronto by train to Owen Sound in Georgian Bay (a part of Lake Huron); from thence by inland steamer across Lake Huron and through the Sault Ste. Marie canal and lock into Lake Superior, and across this lake to Fort William. The journey by water took only an hour or two short of two days. From Fort William a night's journey by rail brought us to Winnipeg, the rapidly growing capital of Manitoba, and the natural centre for all the enormous wheat-growing area of Western Canada. Winnipeg had recently celebrated having grown to 100,000 inhabitants, whilst in 1871 there were one hundred only. It is a very progressive town, in that it has electric lights, telephones, electric tramcars, and other modern conveniences very greatly developed, but otherwise is a vast uninteresting collection of wooden houses in the usual strict rectangular blocks, with roads and sidewalks as yet in a very primitive condition—on the whole, a very depressing place to a casual observer. It has of recent years suffered from several severe outbreaks of enteric fever, due to unprotected and inadequate water supply. This is being altered. The journey from thence to Banff, in the Rocky Mountains, took a day and a half, passing successively through the wheat-fields of Manitoba and Saskatchewan and the vast ranche country that separates this wheat-growing belt from the country lying at the foot of the Rocky Mountains. This is the new province of Alberta, which has shown itself of recent years to be such a fertile area, and to which the great stream of emigration from the northern States of America and from Europe is now largely directed. The chief stopping place was at the town of Calgary, which has, in a few years, grown to be of considerable size, though Edmonton, further to the north, and connected to the main transcontinental line by a branch line from Calgary, has been selected as the capital. Calgary has the same unfinished and unbeautiful appearance as the other towns in this new region, but boasts of all the advanced modern conveniences, including daily newspapers. I gathered that in this town of 14,000 or 15,000 inhabitants there are already some twenty-five to thirty medical practitioners;

so it would seem that medical provision has even been provided more rapidly than the population has grown. On this journey I had the pleasure of making the acquaintance of Professor Adami, of McGill University, who was also travelling to the Rocky Mountains.

After a stay of a day or two at the fine hotels of the Canadian Pacific Railway Company at Banff and Laggan, the latter being situated most romantically on the shores of Lake Louise, a most picturesque lake, surrounded by the loftiest peaks of the Rockies, with an enormous glacier coming down almost to the level of the lake on the side opposite to the hotel, the return journey was commenced.

This hotel at Lake Louise is situated at about the same level above the sea as is Kurseong, but at the time—the first week in September—that I was there it was distinctly warmer than Kurseong is during the hottest month of the year ; one could feel comfortable in summer clothing and almost sit outside at night without an overcoat. It is difficult to account for this when one considers the great difference in latitude, but the influence of the greater length of the days shows itself most markedly in this part of the world. It is not easy to realise that in winter the thermometer goes down every year to something like 40° Fahr. below zero. The character of the vegetation, however, bears evidence of this. On the whole I was disappointed with the scenery in the Rocky Mountains, having read such extravagant accounts. They are unquestionably very bold and striking in outline, but, as their name implies, they are very bare, and the stunted character of the vegetation in the valleys and absence of undergrowth renders the landscape much less pleasing than either the Alps or the Himalayas. The numerous small mountain lakes, especially Lake Louise, are, however, very beautiful ; the colours of the water, owing to reflections from the hills, are at times extraordinary, especially so in the early morning. Although it would hardly repay the long journey to go to the Rocky Mountains alone, yet in the future I expect many Anglo-Indians will return to Europe by this route and stay awhile in the Rocky Mountains on their way. The Canadian Pacific Railway have now inaugurated a first-class fortnightly service in their own steamers and over their own lines from Hongkong to Liverpool *viâ* Japan, the journey taking less than twenty days from Japan to London.

PART II.

UNITED STATES.

ROCHESTER.

FROM Laggan we started to return *viâ* the United States, making a two-days' railway journey *viâ* Portal and the Soo* Railway to St. Paul in Minnesota, returning as we went as far as Moose Jaw, then crossing the Canadian-American border and passing through the State of North Dakota, a remote wheat-growing northern State. St. Paul and Minneapolis, which are adjacent cities, commonly called the twin cities, are largely devoted to the wheat and flour trade, and are examples of the rapidly grown cities of the Western States; together they now have a population of over half a million.

From St. Paul a journey by a branch line of five or six hours brought us to Rochester, in the southern part of the State of Minnesota. This little town has become famous throughout the surgical world as being the seat of a hospital in which it is recognised, at least in North America, that the best surgical work performed in the States is to be seen. Rochester is an out-of-the-way town, the centre of a small sub-division of the State, apparently more "dead-alive" than the smallest of English country towns, and even, to first impressions, hardly civilised. Its chief hotel, for instance, was what one would have expected if it were provided for the cow-boys of a Texan ranche. Yet this town of 7,000 or 8,000 inhabitants, without a good railway service, and at least twelve hours by rail from Chicago, the nearest city of real importance, is the Mecca to which large numbers of sick people of all grades of society take their way when they have made up their minds that an important operation is necessary, and also to which a constant stream of medical practitioners from the remotest parts of the United States and Canada, and in less numbers from Europe, bend their way with a view of seeing the surgical work of acknowledged masters. At Rochester is performed the surgical work of the brothers W. J. and C. H. Mayo, which has become so famous. That this has become so acknowledged is shown by the fact that the elder brother, Dr. W. J. Mayo, is this year President of the American Surgical

* The St. Paul, Minneapolis and Sault St. Marie Railway is generally so termed; the word is a popular contraction of Sault St. Marie.

Association, and was acknowledged at the meeting of the British Medical Association at Toronto to be the representative of progressive American surgery.

This work is done at Rochester no doubt on unique lines, in that it is carried on in a remote town—one might almost say village—and absolutely without the surgeons being connected in any way with a public hospital or teaching institution, though the general arrangements of the private hospital are much the same as I later discovered at Chicago, and doubtless as exist in other large centres.

The surgical work of the brothers Mayo at Rochester is done in a well-built and handsome building, St. Mary's Hospital, furnished much in the manner of a private mansion. It has about 150 beds, practically all in separate rooms. I gathered that this hospital had been built partly from subscriptions, but was entirely a paying hospital, being managed in all its business aspect by a Roman Catholic sisterhood. I understood the Mayo brothers had no pecuniary interest in the house part of the hospital, but that they had complete control of the treatment in every way—paid for the dressings, drugs, etc.; and the resident officers were practically their paid assistants. The patients paid separately for their medical or surgical treatment (practically only cases for operation were taken in), which was, I gathered, graduated according to their means and generally was an inclusive sum. Naturally the character and class of the room they selected would bear relationship to the amount of the fees charged them, reducing thus greatly the amount of inquisitorial inquiries necessary, especially in a country where outward appearance and evidence of education bear but little reference to the monetary position of the individual. The patients are admitted mostly from the "office" (so-called in America) of the firm, which is situated in the centre of the town, the hospital being about a mile away on the very outskirts. These consulting rooms were quite extensive, and during consulting hours (afternoon) were a centre of great activity. I was informed that patients presented themselves at an office, where various particulars of a non-professional character were taken down by clerks; they were given something corresponding to a history ticket, and then they made a journey through a series of examination rooms, each of a special character. In one the urine would be examined, and, if necessary, would be separated or a cystoscopic examination made; in another X-ray photographs would be taken and so on, according to the case, every kind of special examination would be made. Finally the patient would come before one of the partners, who would complete the diagnosis and decide what treatment should be undertaken. Patients were commonly sent to hospital at that time and generally operated on the next morning. It is evident that such a system of universal specialising under one roof is the way to obtain from division of labour its best results.

At the hospital itself operations daily engaged two surgeons (usually the two brothers, but when I was there Dr. W. J. Mayo and his chief assistant, Dr. Judd) continuously from 8.15 a.m. till about 1 p.m. The same systematisation was also observable, the most noticeable of the points being the regular way in which a microscopical diagnosis of tumours was made by a skilled pathologist in a laboratory

adjoining the operation rooms whilst the operations were in progress. There were two operating rooms, with a sterilising and instrument room between and connected with each. There was nothing very exceptional about these rooms, which were not very large; the furniture was not very elaborate, being mostly of white enamelled metal. Everything, however, was covered by sterilised cloths. The absence of lotions and of douches was a very noticeable point, ablution of wounds or of the abdomen being practically never resorted to.

The surgeon and his assistants of all kinds, nurses, etc., wore masks over the head and face made of sterilised gauze, used indiarubber gloves, and, of course, the universal white overalls. They did not wear special shoe coverings.

As is practically universally the case, a captious critic might have picked serious holes in the completeness of the aseptic technique, but, doubtless, everything that matters had been provided against.

Operations are performed every weekday throughout the year. On the four days that I visited the clinic the list amounted to thirteen or fourteen each day, of which at least ten were capital operations, and not more than two or three such minor operations as perinæorrhaphy, removal of sequestra, or circumcision. The great majority were major abdominal or pelvic operations. Perhaps two or three of the operations were postponed for want of time, but it was easy to see that the year's list would amount to close on 3,000 important operations which the annual report of the hospital claims. Dr. W. J. Mayo, appears to be especially fond of gall bladder, stomach, and female pelvic surgery. The other brother, Dr. Charles Mayo, who was on a holiday, I gathered took greater interest in more general surgical work.

During the week I was there, there was an average attendance of quite forty medical men. I was told this was not at all unusual, as there is a continuous procession of men staying four or five days, or a week, and others then taking their place. The courtesy extended to visitors by Dr. Mayo was much beyond what could possibly be expected, and the British surgeons who had come on after the Toronto meeting were made especially welcome. Dr. W. J. Mayo has a very incisive and interesting way of imparting information, and continually laid down his views on many surgical matters in a forceful yet by no means egotistical fashion. We gathered that his views on many matters, especially on operating in cases of malignant diseases, were far more conservative than would have been expected.

Another detail that gave rise to astonishing comment by everybody who had followed the work for several days was the extraordinarily successful way in which ether was given. The anæsthetists were two ladies of middle age, who, we gathered, had devoted their lives to this work, but were not trained in medicine—an extraordinary circumstance, but still, from a surgeon's point of view, the anæsthetic could not have been better given; the absence of struggling, and also the absence of any alarming symptoms, was remarkable. I doubt, however, whether the hospital authorities in London would quite approve of the method on account of its cost. The method used was the drop open

method on to a large mask, in principle the same as Esmarch's chloroform mask. A twig of gauze was inserted into a groove in the cork of an ordinary one-pound tin of ether, and by this a constant dropping of ether on to the outside of the mask was effected. Inquiries brought out that by this method nearly three times as much ether was expended as in the apparatus usually used. One of these ladies had given ether to close on 20,000 patients without a death. One of the Roman Catholic sisters was Dr. Mayo's chief assistant. She had assisted him at every operation for years.

To give an idea of the daily work performed I will transcribe notes made during the four days I visited this clinic in the first week in September, 1906. On September 5th the operations lasted from 8.15 a.m. till after 1 p.m., but at that hour the list had not been completed, and one or two were postponed to the next day, and this was about the experience every day.

1. To commence with, on September 5th I saw a case of appendicectomy for ordinary recurrent chronic appendicitis. The proceeding was identical practically with the operation as I saw it later performed at other American clinics, there apparently being little difference now in technique anywhere. A gridiron incision was made in the flank as usual, and the operation was continued by the separation of the appendix by ligaturing the appendical mesentery with catgut, crushing the stump with one pair of forceps, removal of appendix between that and another pair of forceps. It was completed by the invagination of the mucous membrane by means of a little metal rod and a purse-string suture of catgut. A special reinforcement of this suture was made by reduplication at the seat of mesenteric attachment. The invaginated part was further drawn together by an outer row of Lembert's sutures.

During the morning, I also saw two or three other appendices removed incidental to other abdominal operations. Dr. W. J. Mayo did not go quite to the extent that is urged by some, viz., to remove the appendix in every case in which the abdomen is opened, whether the appendix is diseased or not, on the ground that it is useless and may become troublesome, and that little additional risk is incurred. He, however, removes the appendix in all cases where there is any chance of that organ coming into contact with any portion of the abdominal cavity interfered with during the course of the operation, such as in operations for ovarian tumours or pelvic inflammation on the right side; he also removes it if he sees the slightest deviation from the normal in the appendix, or if there has in the history been anything which gives rise to suspicion that there had, at some previous time, been trouble in connection with it. As a matter of fact it was removed in most cases in which the abdomen was opened for pelvic trouble, both in this clinic and others I visited later.

2. The next case seen was one of gastro-jejunostomy for pyloric obstruction due to malignant disease of pylorus or duodenum. A double clamp was used for the stomach and intestine, bringing portions of both nicely into apposition for the suturing, *i.e.*, it was an instrument with three arms. The posterior operation was performed and union was effected by sutures, Pagenstecher's linen (cellulose) thread being used. Dr. Mayo

pointed out certain vessels in the gastro-colic omentum, which served as a safe guide between which to penetrate in order to reach in safety the posterior surface of the stomach.

3. A cyst of the broad ligament of large size, nearly filling the abdomen, in a woman forty-eight years of age. There was free fluid also in the peritoneal cavity; hence malignancy was suspected, and the patient was therefore kept on the flat, and not raised, as usual, into the Trendelenberg position. The tumour was removed from the abdomen by an unusually large incision and only punctured outside the abdomen. The pedicle was ligatured with strong catgut and the tumour handed over to the pathologist for examination. By the time that the pedicle had been secured, and the appendix removed, the pathologist returned and reported there were signs of malignancy in the tumour. Dr. Mayo then proceeded to remove the remaining ovary and to perform a supra-vaginal hysterectomy. He said that this should be done in all cases of ovarian cancer, but that it was not necessary to remove the cervix, which was hardly ever involved; he said that ovarian cancer passed from one ovary to the other and then to the uterus. During the process of covering up the stump with peritoneum he secured the round ligaments to the stump of the cervix, in order to give a support to the floor of the pelvis.

From remarks made during this operation, it appeared that it was the practice in cases of this kind not to keep the patients lying still on their backs for many days; it is the practice to slightly raise such cases as this in bed from the first, the next day to allow them, if wished for, to change from side to side, and in a very few days they are propped up to the sitting position in bed—in fact, it is believed that the risks of keeping patients, especially rather elderly ones, lying flat on their backs are greater than the dangers likely to arise from traction on the severed and unhealed tissues. Thus appendix cases are made to walk about at the ninth or tenth day. He also instanced, as an argument in favour of this view, that phlebitis, occurring after pelvic operations, was due to the length of stay in bed, and not to inflammatory causes in extension from the wound, since it, he said, generally occurs in the left extremity after right side operations.

4. A case of retroflexion of the uterus with a torn perineum accompanied by old standing adhesions from pelvic inflammation.

He started by repairing the perineum, as far as I could make out, in the fashion of Lawson Tait, but two very deep muscular catgut sutures were used, being buried. He finished this part of the operation by making what he called an artificial hymen; this was for the purpose of preventing the urine soaking into the line of sutures, and would allow the use of the catheter to be abandoned very early. The abdomen was then opened, considerable adhesions were found, which were separated, and then the operation, which in America is called an internal Alexander, was performed. The internal Alexander operation for retroflexion or prolapse of the uterus seems to be the favourite treatment for this condition in America; it varies in details in different hands, and does not always go by this name. It is evident that at the present day there is a radical difference in the treatment of these conditions on the different sides of the

Atlantic. The discussion on Dr. Giles' paper on ventrofixation of the uterus at Toronto showed this divergence very markedly. Dr. Mayo—and he apparently voices the general trend of opinion in the United States—believes neither in ventro-suspension, nor ventrofixation. He considers they are altogether too artificial and opposed to the natural processes of suspension of the uterus. He, with most American surgeons, believes that Alexander's principle was right, though the method Alexander advocated of carrying out his principle is unsatisfactory and uncertain. American surgeons prefer, therefore, to shorten the round ligaments under inspection inside the abdomen. This was first attempted by the simple plan of practically tying a bow knot, but the operation which Mayo performs was devised to follow more closely the principle advocated by Alexander. The operation as I saw it performed was to separate the peritoneum from the posterior sheath of the rectus on either side for about 2 inches with the end of a rather fine pair of dressing forceps, to pass these dressing forceps through the peritoneum in the neighbourhood of the internal ring, to seize the round ligaments about $1\frac{1}{2}$ inches external to the uterus, and to bring the doubled ligaments through the openings in the peritoneum and suture them together across the middle line. In another case, on a subsequent day, the round ligaments being shorter, they were sutured to the tissues and not brought across to the middle line.

In this case, as in most abdominal sections, he anchored the bladder below the line of incision, as he says that union of the bladder to the cicatrix is one of the causes of the chronic, very distressing, urinary trouble after abdominal section, which tends to give a bad name to surgical enterprise.

5. The next case was an anterior gastro-jejunostomy for tumour of the pylorus causing obstruction. There was a doubt as to the nature of the tumour. When the abdomen was opened Dr. Mayo considered it to be malignant, but the pathologist, to whom a small snip was given, did not confirm this; but Dr. Mayo preferred to trust to naked eye appearances, believing that he had not removed a portion of the tumour itself. He performed an anterior junction in this case, because the extensive adhesion prevented the stomach being satisfactorily drawn out of the abdomen, and further he feared to cause, for the same reason, hæmorrhage in perforating the gastro-colic omentum. For the connection he used McGraw's ligature, of which I had previously not heard; it is simply an indiarubber tube about the size of a feeding-bottle tube, but more solid. The intestine was roughly sutured to the stomach by a posterior half-circle, the tube threaded to a needle passed in and out, first through the intestine and then through the stomach and back again, and tied tightly when on the stretch. The knot is secured by a treble silk ligature and tied, and the ends of the tube cut off close. The posterior half-circle of silk is then continued round. It was said the ligature would make its way through and pass out by the intestine. Its advantages over Murphy's button is that there is no danger of it passing into the stomach, instead of into the intestine, and remaining there, and the operation is an easier and quicker one than union by sutures sufficiently accurately to at once prevent leakage. It is evident that until separation of the sphacelated part of

the stomach takes place that complete obstruction remains, but it is said this lasts for two days at the most, and in most cases little harm is done by even a much longer abstention from feeding by the mouth.

6. This case was followed by an abdominal removal of an extensive malignant disease of the upper third of rectum and sigmoid flexure in a man of about 60 years of age. The ordinary central incision was made and the liver examined for presence of secondary nodules. Such not being found the growth was extirpated in an extremely bold manner. To an onlooker it appeared to be working very much in the dark, and hence highly dangerous, but the success was complete; scissors were used to remove the intestine with the growth, the intestine being of course clamped off above and below, but arteries were clamped as the incisions progressed. The diseased part having been removed, a flap incision of considerable size was made through the left lateral abdominal wall. The upper incised end of the gut, after being closed carefully, was brought through this incision and sutured in and left for subsequent opening out. The lower end was treated with the actual cautery, was deeply invaginated, and drained from the rectum, the peritoneal covering being closed from above after the invagination. On enquiry before leaving on the Saturday, it was stated this patient was doing very well.

A similar number of operations of only a degree less importance were simultaneously performed in the second operating room.

September 6th. The operations performed this day were, on the whole, of greater importance, and showed Dr. Mayo's great manipulative skill and resourceful rapidity perhaps more markedly than on the other days, the gall-bladder and stomach operations being exceedingly brilliantly performed.

1. Cholecystectomy. Case diagnosed as gall-stones and probable appendicitis. An incision was made at edge of rectus, rather lower down than the usual incision for gall-bladder operation; through this the appendix was examined and found healthy. This incision I saw made several times later, as it was recognised that mistakes of diagnosis are not uncommon, either that of mistaking gall-bladder trouble for appendix trouble or *vice versa*, especially when relying on a history alone.

At the operation, several gall-stones were found in the gall-bladder, and were removed by a special long scoop; but one was found in the duct of the gall-bladder and could not be brought into the bladder. Cholecystectomy was therefore performed. In closing the wound the omentum and colon were brought into place to keep the small intestines from coming into contact with the seat of operation, and, further, a double piece of gutta-percha tissue was lightly sutured to the skin and tissues to prevent the adhesion of these to the area denuded of peritoneum. A gutta-percha and gauze (cigarette) drain was used.

2. Another Cholecystectomy. In this case the gall bladder was distended to about the size and shape of a sausage. One stone was implanted in the cystic duct. It was evident that the operator favoured cholecystectomy instead of cholecystotomy where there was any risk of bruising tissues in removing the contents of the gall-bladder or ducts.

3. The next case was one for a persisting sinus after an operation, by another surgeon, for gall-stones, two years before. He stated that these cases of persisting sinus usually meant that a gall-stone had been left behind and, that, where the discharge consisted solely of mucus or muco-pus, it meant that the calculus was in the gall-duct and not in the common duct, in which latter case it would contain bile.

At the operation, a vertical incision in the usual site (outer edge of right rectus) was made, although at the previous operation the incision had been a very large oblique one. The sinus was completely dissected out and the remains of the gall-bladder removed (cholecystectomy). A calculus was found imbedded in the duct in the midst of cicatricial tissue.

4. A Large Ovarian Cyst. A very large incision was made to evacuate the tumour without reducing its volume. The pathologist declared it to be non-malignant. Great interest attached to the unexpected discovery that the uterus was a well-marked bifid one. The tumour arose from the ovary connected with the left uterus.

The appendix was removed in this case, although it showed little apparent signs of disease.

5. Gastrectomy. This was, I think, the most brilliant operation that I saw, both from its magnitude and on account of the wonderful manipulative skill shown. The control of hæmorrhage, indicating extreme familiarity with the blood supply of the stomach, was masterful in the extreme.

The operation was done on a woman of 41 years of age for malignant disease of pylorus. The first step was to control the blood supply, which, as stated, was done with extraordinary precision and despatch; the duodenum was then separated, then the pylorus, with rather more than one-half of the stomach, was removed. The upper half of the stomach was controlled by special large clamps; one large clamp was applied from below, extending right across the stomach, and a second smaller one to reinforce the first clamp was also applied from above at the lesser curvature, which part was said to be likely to slip from a single clamp. The direction of the incision was oblique, removing more from the lesser than the greater curvature. The clamps were covered with indiarubber tubing. The actual cautery was used to the severed mucous membrane before the clamps were removed. The stomach was closed by what is now generally known in America as Mayo's suture, a very clever yet simple device for inverting and tightly closing two cut edges of this nature. It is difficult to give a description of this suture which can be followed; it is a continuous suture which, with but very little assistance with instruments, turns in and firmly closes a great length by simply pulling on it; it is really, however, a continuous suture on the principle of Lembert, the double insertion beneath the sero-muscular coat being made parallel to the cut edges alternately. The operation, of course, was completed with a gastro-enterectomy, which was performed with sutures. The patient was under the anæsthetic less than an hour.

6. The last operation I saw that day was for cancer of the cervix uteri. The

patient had been prepared for vaginal hysterectomy, but after final examination, Dr. Mayo decided not to perform it, as he said he could not get beyond the disease. He curetted the growth and cauterized it most freely, indeed to the onlooker it appeared that the succeeding sloughs must open up the bladder. He stated he was not much of a believer in extensive operations for uterine cancer, and spoke sarcastically of Wertheim's and other similar operations, based on the complete removal of pelvic glands. He based these views on the assertion that recurrence took place through extension around the ureters, and that infection, or rather recurrence, in the glands took place later. He said the proper treatment would be transplantation of the ureters into the bladder or rectum, but results had been unsatisfactory.

There were about the same number of operations performed by Dr. Judd in the adjoining theatre, including removal of appendices, radical cure of hernia, operations for talipes, etc.

On September 9th, I saw the following operations :—

1. For pelvic tumour diagnosed as carcinoma. Female about 50. Found to be a large fibroid tumour of right ovary, with carcinomatous degeneration in one area; there were also secondary carcinomatous patches on lateral peritoneal walls and on the tip of the appendix. The tumour was removed through a large incision; it was the size of a small football, with a pedicle easy to ligate. It was considered useless to attempt to remove the secondary deposits, though it was said there are cases on record which seem to have been satisfactorily proved by competent microscopists, where, after opening the abdomen, similar deposits appear to have disappeared. Dr. Mayo stated that in 1,200 cases of removal of appendix, only two cases of primary malignant disease of that organ had been found in this clinic.

In closing large apertures in the peritoneal covering of the broad ligament, Dr. Mayo advocates leaving a small opening into the peritoneum. He said the peritoneum dealt with discharges better than a closed cavity in the connective tissue.

2. For pyloric obstruction in an old man of about 80 years of age, who had insisted on being explored even if nothing could be done for him. The obstruction was believed to be malignant. This, however, was not found to be the case; the obstruction was due to dense adhesions round the pylorus which were thought to be due to an old duodenal ulcer; which, by the way, Dr. Mayo stated was much more frequent as compared with gastric ulcer than was generally considered to be the case. Recent surgical enterprise in the upper alimentary tract has pointed unmistakably to this. Another case of post-mortem pathology being at fault. An anterior gastro-enterostomy with Murphy's button was performed, it being in this case, as in one previously related, impracticable to satisfactorily get at the posterior surface of the stomach.

Murphy's button was used as it is supposed to require less time; this advantage, as compared with suturing in the hands of an expert operator, such as Dr. Mayo, did not appear to be of much account, though doubtless, in less skilled hands, the difference would be a very great one. It was said that there had been one or two cases where

Murphy's button had not taken a satisfactory course after it had sloughed away ; in several cases it had fallen into the stomach and had had to be removed by gastrotomy. A modification has recently been introduced by Murphy, the button now being more of an egg shape with the heavier end pointing downwards; it is said that its course is now invariably in the direction desired.

3. The case was one said to be for fibroids of the uterus. No fibroids, but a retroflexed uterus was found on opening the abdomen. The operation known as the internal Alexander, previously described, was performed. In this case the round ligaments were short and were therefore sutured to the sheath of the rectus. The appendix was also removed.

4. An operation in a woman about 35, in which it was stated the cause of the trouble was doubtful whether it lay in the appendix or the gall-bladder, but preference was given to the latter. As an aid to diagnosis it was said that the first attack of appendicitis was usually severe, later attacks less severe. With gall-stones it was usually the reverse.

The small preliminary incision at outer edge of rectus opposite to the umbilicus for exploration of either the gall-bladder or appendix was made and the gall-bladder found, rather unexpectedly, to be healthy, but a much enlarged and thickened appendix was removed in the usual way, the incision being slightly enlarged downwards.

5. A case of a child about 5 years of age, who was evidently in a very serious state. He had had intestinal obstruction for three or four days before being brought for treatment, and there was much distension of the abdomen and meteorism. It was thought that the cause of apparent obstruction was peritonitis, probably appendicical in origin, though the possibility of it being due to a Meckel's diverticulum was to be kept in mind. It was considered very unlikely to be due to an intussusception, as there were none of the special symptoms of that condition present. Dr. Mayo spoke very strongly of the value of auscultating the abdomen in cases of obstruction, the presence of borborygmi and intestinal movements meaning that nature was endeavouring to overcome the obstruction, and that therefore the obstruction was physical in character, and an operation with a view to treat the obstruction was likely to be successful; whereas, in the opposite case, the appearance of obstruction was probably due to paresis of the intestine, as, for instance, in lead poisoning, or inflammation of the peritoneum; in either case an operation, hoping to find some definitely localised and removable obstruction, would be useless.

The case turned out, as expected, to be one of purulent peritonitis, evidently having its origin in a perforated appendix. On incision in the middle line, the tissues were found matted together and a pocket of sero-pus found. The bladder had become drawn up and was unfortunately nicked by the knife and urine escaped. It was, however, a very small opening and was readily closed. Another incision was made over the appendix and a suppurating organ removed from the midst of an abscess pocket. An iodoform gauze drain through a glass tube was inserted here and a cigarette drain put

into the left flank through a third incision. It was said the boy would be propped up in bed, Fowler's position, to drain away from the upper part of the abdominal cavity, which it was frequently impressed is the dangerous zone in peritonitis, and he would have a continuous irrigation of the lower bowel with saline solution until recovered from the shock. Continuous irrigation per rectum seems to be the accepted method of treatment of shock ; very low pressure is kept up through a small soft catheter passed into the rectum, so that a continuous but at any time small quantity of salt solution is available for absorption. We gathered the boy was doing well the next morning.

6. The next patient operated on was an old woman of 80 with prolapsus uteri, ulceration of cervix and cystocele.

It was said that in this class of case it was not so much the prolapsus uteri which was complained of, but the inconvenience caused by the cystitis, due to the cystocele, which, especially in women of some refinement, caused great annoyance.

The operation performed was as follows : The cervix was amputated and from the anterior part of the incision for this, a cut was made through the mucous membrane of the vagina to near the urethral opening, and the whole thickness of the vagina separated freely on either side from the bladder. The anterior fornix was then opened as in anterior colpotomy (vaginal fixation). The fundus uteri was brought down and the bladder displaced upwards, the vaginal flaps were then brought down and united over the anterior surface of uterus and also made to cover the amputated cervix. In this way the bladder was made to rest permanently on the uterus, which lay between it, more or less, and the pubes. This was said to be the most effectual operation for this class of case ; of course being only available after the menopause.

7. For a mulberry-like tumour of female urethra. On removal the pathologist declared it to be malignant on a papillomatous base. It was freely removed, the urethra being cut across and brought down into anterior vaginal wall.

8. The last operation I saw that day was some very extensive removal of portions of ribs from an old empyæma with sinus. A very useful rib-cutting forceps was used which answered much better than most I have seen, otherwise there was nothing special in the case.

As usual some five or six other operations were performed in the other room, and included such work as removal of non-malignant tumour from the breast, radical cure of hernias, and bone operations.

On September 8th, owing to an early departure for Chicago, I only was able to remain for a part of the morning, and have only notes of three cases, though from my notes it is doubtful on which day an operation in which a calculus was removed from the ureter was actually performed. This operation was one which showed extraordinary pertinacity on the part of Dr. Mayo, and though it was evident rather a serious mistake in diagnosis had been made, yet it showed that a master can rise to the occasion when great difficulties present themselves. It must, however, be admitted that the patient's interests seriously suffered through the unavoidable error in diagnosis.

The patient, a woman, was put on the table with a diagnosis of gall-bladder trouble, and the usual preliminary small incision made for examination. The gall-bladder and neighbourhood were found to be healthy, but a tumour was detected in the position of the kidney on that side. The other kidney was rapidly palpated and found to be healthy. Dr. Mayo then sutured up the abdominal wound, and turned the patient on to her left side, and exposed the right kidney by an incision in the lumbar region, but contrary to what had been expected no calculus was found in the kidney or its pelvis. In a moment the operator, by means which I did not happen to follow, came to the conclusion that a calculus was impacted low down in the right ureter. The kidney was replaced, and this incision closed. The patient was again brought back on to her back, and an extraperitoneal incision, as for tying the iliac arteries, was made. The calculus was located low down in the pelvis, and was worked upwards to a convenient position; the ureter was then incised and the stone extracted. This series of operations had been witnessed in almost deathlike stillness by the large number of medical men present, and its final successful completion was greeted with well-deserved acclamations. It is, of course, open to great question whether, when the mistaken diagnosis—one which must occasionally happen even to the most infallible person—had been discovered, it would not have been more to the interest of the patient that she should have been returned to bed, and whilst the first wound healed she had been subjected to the X-rays. It seems certain with this method of diagnosis the calculus would have been located, and could have been removed, possibly by a vaginal incision, which would have been much preferable to the extensive separation of parts that took place by the extraperitoneal incision employed. This incision, no doubt, was entered upon from knowledge of the well-known tendency of ureteral calculi to become impacted in the slight constriction of the ureter just above the level of the brim of the true pelvis. Allowance must be made in making criticisms for the great objection there always is to not finishing an operation, at least to the extent of removing the cause of the symptoms, when once the patient has submitted to operation.

On this morning I saw a curetting of the uterus followed by an internal Alexander. The uterus was dilated by branched dilators rapidly, as seems to be the usual practice in America, as opposed to the use of tents or graduated dilators as in England. Dr. Mayo's practice is to swab the interior of the uterus with pure carbolic acid, and to wash the excess of acid away with alcohol, paying particular attention to the cervix to obviate cicatricial contractions.

I also saw a cholecystotomy with removal with the spoon of five or six small calculi. In this case there were extensive adhesions from peritonitis, and the operation was somewhat difficult. A small tear occurred in the duodenum, which was ligatured and the area reinforced by transplantation of a small flap of tissue derived from the thickened gall bladder. Dr. Mayo, who as a rule prefers cholecystectomy, gave his reasons for leaving the gall bladder in this case; they were that the extensive adhesions would require separating, with probable damage to neighbouring organs or to their blood

supply, and the hæmorrhage would probably be difficult to control; secondly, the history of the case showed there had been attacks of gall-stone colic, accompanied by a certain amount of jaundice, which showed that the common duct was almost certainly to some extent implicated, and should, hereafter, another operation become necessary, it would be a great advantage to have the gall bladder as a guide to the seat of obstruction in that duct. The seat of operation was drained with the so-called cigarette drain, namely, a thin roll of gauze surrounded loosely by a covering of double gutta-percha tissue.

Dr. Mayo made remarks on the special liability of embryonic or functionless organs to give rise to trouble, pointing out the frequency of inflammatory troubles in the appendix, in the gall bladder, and in wisdom teeth. He likened this case of cholecystitis with gall stones, which we had just seen operated on, to the quiescent stage of recurrent attacks of appendicitis.

The last operation I saw before leaving that morning was another case of partial gastrectomy for malignant disease of the pylorus, the connection with the intestine being made by a posterior gastro-enterectomy. It was performed as in the case of the patient operated on on a previous day.

The following are some points in the technique used in this clinic and in the management of cases so far as they have not been referred to already, taken from a report by Dr. S. G. Gay:—

Preparation of Patient.—Before entering the operation room the field of operation is shaved and scrubbed with soap and water, but no antiseptics are applied. In the operating room the seat of operation is washed off with Harrington's solution, which is an alcoholic solution of bichloride of mercury of rather less than 1 per 1000 strength. This is said to destroy germ life in thirty seconds. An artificial sponge saturated in this is kept applied until the operation is ready to begin, when the area is wiped off with alcohol.

Vaginal cases have the vagina thoroughly scrubbed out with soap and water on the previous day, followed by bichloride of mercury, 1 in 3000, or boric acid solution douching, and are sponged out with alcohol. In cancer or infected cases the treatment lasts for four or five days, the vagina being packed with iodoform gauze wet with tincture of iodine.

Treatment of Shock.—Strychnine is never given either as a preventive before operation or in the actual treatment of shock, but in some cases hypodermic injections of morphia are given one hour before operation. Saline solution is given by the rectum for shock, almost never by transfusion or subcutaneously; it is given either in one injection of about a quart, or, in later treatment, by the continuous instillation method described on page 15. Occasionally brandy is given with the saline solution.

After Treatment.—The posture in after treatment has been referred to on page 9. Feeding is usually commenced with hot water in the afternoon of the day of operation in ordinary section cases, one ounce being given at a time. In stomach suture cases it is

given after twenty-four hours. Beer is given on the second day, butter-milk on the third, alternating with beer ; toast and light diet on the eighth and ninth days, gradually going to solid food.

If vomiting is protracted or returns, the stomach is washed out and calomel, gr. $\frac{1}{4}$, is given every half-hour, until perhaps ten or twelve doses are taken. Uncomplicated abdominal cases get one ounce of castor oil on the fourth day ; drainage cases not usually until the seventh day. Soap enemas are given at any time that gas becomes troublesome, and where obstructive signs are present they are given with a long rectal tube, and may be repeated with magnesium sulphate and glycerine. In protracted vomiting, rectal feeding is resorted to ; it consists of beef, milk, and gluten (Wyeth Bros., Philadelphia) 2 ounces, hot water 1 ounce, and is repeated every four hours ; endeavour is also made to give two saline enemas of 1 quart each in 24 hours.

Methods of Sterilisation.—Suture materials used are catgut, silkworm gut, horsehair and linen cellulose.

Catgut is sterilised by Bartlett's method, which is as follows:—

First:—The catgut is dried in hot-air chamber, covering the bottom of this chamber with asbestos paper, being careful not to permit the gut to come too near the side walls of the steriliser, which would cause it to become hard and brittle. The hot-air chamber is heated slowly, endeavouring to reach a temperature not exceeding 220° Fahr. At 180° the thermometer should be carefully watched to prevent the temperature rising too rapidly ; it is kept at 220° for about thirty minutes.

Second:—The catgut is then transferred to an asbestos-lined kettle, where it remains in liquid alboline for twenty-four hours (alboline is an hydrocarbon derived from petroleum).

Third:—It is heated in this oil on a sand bath, the temperature being gradually and carefully raised in the course of one-and-a-half or two hours to 320° Fahr. and kept at this temperature, or just below it, for one hour. Great care is necessary to prevent the gut becoming brittle.

Fourth:—It is preserved in best Columbian spirits (not grain alcohol) with 1 per cent. of crystal iodine. The excess of oil should be removed before preservation. Numbers 1, 2 and 4 are used.

Silkworm gut is boiled or sterilised in steam steriliser and kept in alcohol 60 per cent., water 40 per cent., crystal iodine 1 per cent.

Horsehair is washed in soap and water for five or six days and kept in bichloride of mercury solution 1 in 1000 for twenty-four hours, then kept in the same solution as silkworm gut.

Linen is sterilised with instruments or dressings.

The hands of the operator are prepared by thoroughly and freely scrubbing with soap and water, then with Harrington's solution, followed by alcohol. 1 in 4000 bichloride solution is used in basin for the hands during the operation.

One of the most interesting and instructive details in connection with this visit to

Rochester was the privilege of attendance at the meetings of a society called the Rochester Surgical Club. This is an organisation for discussing surgical subjects, which had a small permanent nucleus of local officers, but the work, other than purely secretarial, was carried on by a succession of members attending the clinic of the Mayo Brothers, as we have seen, mostly for very limited visits. A sitting was held every afternoon at 4 p.m. under the presidency of a chairman elected for a week. At the close of each sitting two reporters were elected from amongst members volunteering, who were given especially good seats the next day to observe the operations, one for each of the operating rooms. At the afternoon meetings each reporter read a report on the operations that had been seen in the morning, and discussion of the subject was invited after each report or after the reports of a group of similar cases; frequently these discussions became very interesting, as amongst the members present there were many who, it was evident, had considerable operating experience, and many illuminating points were brought out. In addition, several good special papers were read and animated discussion took place. Amongst these papers was one by Mr. H. J. Stiles, the well-known Edinburgh authority on surgical diseases of children, who was also visiting Rochester, on congenital pyloric constriction in infants, a subject which has latterly attracted much interest. On the days we attended there was an attendance of from forty to sixty men, of whom some eight or ten were English surgeons with junior hospital appointments. The proceedings were characterised by an exceedingly business-like tone, the chairman of the week being a most matter-of-fact American with a marked Yankee accent, but, though he lolled carelessly in his chair, he kept the meeting to the business and extracted the most possible out of the material available.

Living at the hotel was also a very unusual experience. It has been said that it was in many ways extremely primitive, though, as usual in these western towns, the hotel was well provided with electric lights, telephones and even quite modern baths in a much more up-to-date fashion than the best hotel in quite fair-sized English towns would possess. The hotel, which was of considerable size, was occupied in about equal proportions by prospective patients and their friends and by visiting medical men. It happened that one day I was sitting at the next table to a lady who evidently had a large abdominal tumour, whilst the next day I saw her undergo operation at the hospital. The talk of the whole place seemed to be about the proceedings at this institution; even the carriage drivers who loitered in front of the hotel discussed what had been done in the morning. Rochester showed more closely to visitors the democratic nature of the population of the United States than in larger cities is noticed. The service in this hotel was of an extreme "take it or leave it" character, although even menial servants were most affable, treating everybody as their equals. To an Anglo-Indian this attitude of the people was most striking; one little incident particularly, showing quite a Far West familiarity, remains in my memory as one of the most amusing of my experiences in America. With the friend I was travelling with I went into

a greengrocer's shop to buy some peaches once or twice ; each time we were saluted on entering the shop by the proprietor in a loud voice with "Hullo, boys, what can I do for you"; and there were many other instances of even greater familiarity. The population in this part of America seems to be largely made up of the second and third generations of people from Northern Germany and Scandinavia with some Irish admixture.

Another interesting experience was attendance at an open-air political meeting in support of the candidature of a certain individual for the post of governor of the State of Minnesota. The candidate represented a "total abolition of liquor traffic" party, and was a most fluent and demonstrative orator. Evidently he was an Irishman. The few people who were present did not seem to take him at all seriously—in fact, from what I could learn, the average individual does not take politics at any time seriously—all politicians are looked upon as only self-seeking office-holders, and their active supporters seem to be considered even worse. One hears the word "graft" used almost universally, on talking about the motives of politicians. "Graft" expresses much the same as the Hindustani word "dusturi" or "rishwat" does.

PART III.

UNITED STATES.

CHICAGO.

LEAVING Rochester we passed on to Chicago, which is, perhaps, at the present day, the seat of the most progressive surgical work being performed in any of the great cities of America. Amongst the names of surgeons, with a world-wide reputation, who practise in Chicago, at once occur those of Nicholas Senn, Murphy, and Clarence Webster, though there are dozens of others with almost an equal reputation locally. Chicago is a great centre of medical education, and the number of universities and medical schools, with attached hospitals, of greater or less good reputation, is bewildering ; indeed, in such numbers are they that, in the three days I spent in Chicago, I was quite unable to follow their ramifications or quite to understand which surgeons were connected with which teaching institution. It is claimed that there are more medical students in Chicago than in any other city in the world, and the numbers that were given me certainly seemed to bear out this contention. The same system of having large private one-man hospitals, as seen in Rochester, was found to be extant in Chicago, certainly as regards the very leading men, but in addition these men appeared to be also on the staff of large general hospitals for the poor, where the work is carried out on much the same lines as in England. However, it seemed that the work at the general hospitals was mainly performed by men who had not yet attained to the successful position of those whose work in the private hospitals I had such a good opportunity of seeing.

We passed three days in Chicago, which were filled up as follows:—

Monday, September 10th. We visited the Augustana Hospital and saw the surgeon-in-chief, Dr. A. J. Ochsner, who is the Professor of Clinical Surgery in the medical department of the University of Illinois, operate.

Tuesday, September 11th. We made a short visit to the St. Luke's (Episcopalian) Hospital, and saw Dr. McArthur perform an operation, but had to leave very soon to go to the Presbyterian Hospital, where the well-known Dr. Murphy gives on Tuesdays a kind of clinic. This hospital is in connection with the Rush Medical College, and is apparently a middle class partly paying institution. Ordinarily he discusses the

cases, and is present whilst a junior surgeon under his directions performs the operations he wishes done. After leaving this institution, Dr. Murphy very kindly showed the visitors over the County Hospital, an enormous general hospital in the neighbourhood. It is said to make up 1,200 beds. It is built on a similar system to that of St. Thomas' Hospital, although each of the buildings is of much greater capacity. Except for its size, it did not appear, from a cursory view, to be in advance of, if equal to, the ordinary standard of comfort, convenience, or cleanliness of the average English public hospital.

Wednesday, September 12th. Attended Dr. Murphy's operations at the Mercy Hospital.

I will now proceed to a reproduction of my notes on my actual experiences at these clinics in Chicago.

I arrived at the Augustana Hospital on Monday, September 10th, 1906, some time after the operations for the day had commenced. Six laparotomies had been completed before my arrival; one of these, an operation for appendicitis, was just over; the appendix was shown. It appeared to be practically healthy, but a small ulcerated patch was pointed out in the mucous membrane near its tip.

The first operation I saw was a quite difficult cholecystotomy. A sinus of an old operation existed, the original incision having been very low, evidently made so for simultaneous exploration of gall bladder and appendix. The cicatricial tissue in the parietes was excised, and the contracted adherent gall bladder opened freely, and with much difficulty the calculi were removed. It was claimed that one of the calculi had been pushed by manipulation external to the ducts from the common into the cystic duct and removed from thence by the spoon. The appendix, although apparently healthy, was removed.

In another case Dr. Ochsner removed by crushing several small fibroid tumours of the uterus, using a pair of blunt serrated spoon scissors.

The remaining cases were of a septic character, one a case of peritonitis of pelvic origin in a woman. Dr. Ochsner opened the abdomen and expected to find a localised collection of pus, as there had been a distinct lowering of temperature and amelioration of symptoms for some days; but such was not the case, the peritoneum being still injected and covered with flaky lymph. He closed up the abdomen without draining it, and said she must go back to bed and undergo further starvation treatment. His views on the treatment of acute septic peritonitis differ from those of the modern advanced school, and are not generally accepted by his *confrères*, and caused us much surprise. Dr. Ochsner believes, in cases of acute general peritonitis, in washing out the stomach and almost complete starvation. He believes in the majority of cases that the inflammation localises itself if the small intestines are kept free from peristaltic movements and that localised abscesses are formed, whilst the virulency of the septic micro-organisms becomes exhausted. Operation, he then thinks, may be carried out with much greater safety. He applies this rule also to the treatment of fulminating appendicitis.

I gathered he would operate at once on cases which he believed had not perforated, but where such had taken place when the case is seen, he gives neither food nor cathartic medicines by the mouth, but washes out the stomach if there is vomiting or retching. He continues this treatment, giving only small sips of hot water by the mouth and small nutrient enemata by the rectum until the patient has been free from pain and the temperature nearly normal for four days. He is adverse to large enemata, which he considers dangerous. These views, we found, were strongly opposed by Dr. Murphy, who apparently goes to the other extreme. In many little points there is a friendly difference of opinion between these two leading Chicago surgeons, which, when put in the confident unqualified way in which American surgeons are in the habit of laying down the law, appeared to be absolutely and totally divergent, but one gathered, from some of their *confrères*, that their actual differences in practice were not by any means so great, that in fact neither of them went to the extremes they preached.

There were two other cases, both large appendicical abscesses, which were opened and simply drained.

The operation room at the Augustana Hospital was, as at most of the hospitals visited, not particularly different from the operating rooms we are accustomed to see in all good hospitals in Europe, and even in India. The following points, therefore, are applicable in a general way to all seen. One noticed rather a tendency to use a special, rather dull, glazed small tile for the floors instead of marble. It, however, was laid better than probably would be attainable in India, and hence the objection of numerous joinings could not, as seen in America, be alleged against it, as would be the case in India. I did not notice either that these tiles were liable to fracture, no doubt owing to their incorporation with the bed of cement they were laid on. The walls are usually of marble, very fine large slabs being often used, but a critic could, in most of the operation rooms I saw, find many grounds for finding fault in the construction, as regards ledges left for windows, etc., though it is universal to have the main corners rounded off. The operation tables and aseptic furniture are also much the same as in ordinary use everywhere else: the operation tables have the usual mechanical appliances for raising and lowering, giving the Trendelenberg and other inclined positions. These appliances usually were fairly simple. The furniture was, as a rule, not quite of the expensive type we are accustomed to wish for in India, having usually white enamelled metal and not glass tops. Both operating and instrument and dressing tables are covered for each separate operation with sterilised sheets or towels, and little is seen of antiseptic lotions. Instruments usually are laid out on a sterilised cloth direct from the basket of the steriliser, but in some cases are left in this basket and taken out of it when required individually. The hand sterilising and washing during the course of an operation is usually performed in a washing trough under hot and cold water taps, which are operated either by pedal arrangements or in some cases by long arms, which are pushed backwards and forwards by the elbow of the operator.

The patients are much more enveloped in sterilised special clothing, and the seat of operation set apart by large sterilised cloths pinned on with safety pins, than one has been accustomed to see, the material used being generally a loosely woven cloth, which in American text-books is called butter cloth. Most of the later American text-books have ample illustrations of this preparation of the patient. One also noticed in most cases there was a contrivance for isolating the head of the patient and the anæsthetist from the seat of operation. At Rochester this was done by an arm of copper wire attached to the side of the operation table, and passing across the table below the head of the patient about 18 inches above the table; to this a sterilised cloth, to form a curtain, was attached. It was universal to see the operator and his assistants don freshly sterilised complete overalls of white linen, but there were differences in practice in the use of head coverings, masks, and sterilised foot coverings, as also in the use of india-rubber gloves; in the most complete system all these were used, but this was seen in only one case, special shoes being used only once. At Rochester, indiarubber gloves, with gauze head-coverings and respirators were used, whilst Dr. Ochsner used no head-covering, and gloves only for septic cases; his assistants, however, used gloves throughout. Visitors are generally allowed, if of special importance, to come within the arena, but have to assume sterilised overalls completely enveloping them. More standing round the table was permitted than would have been expected. At Rochester, three or four were thus allowed within the barriers, the remainder, generally some 40 or 50 in number, took seats immediately outside the barrier, and took off their coats before entering the room. In no case were there any elaborate special arrangements to prevent contagion from students or visitors on the benches, in fact, the opinion was expressed that this was a source of danger little to be feared.

The following few points of detail in technique as used at the Augustana Hospital are taken from a paper on Aseptic Surgical Technique by Dr. Ochsner.*

Disinfection of the Patient.—He is given a warm soap and water bath on the day before operation, and immediately before this a large dose of castor oil. On the morning of operation, in suitable cases, a large warm water enema is given; in cases of operation on the rectum this is given on the evening before.

On the evening before the operation the skin over the seat of operation is thoroughly scrubbed with green soap and warm water, then scrubbed with strong alcohol, then a moist dressing of gauze, saturated with a 3 per cent. carbolic acid solution, is placed over the field of operation, covered with absorbent cotton and bandaged on. Before the operation is commenced the seat of operation is scrubbed over again with strong alcohol. It is stated that it is equally efficient to disinfect the skin immediately before the operation, but it is not done to save time.

Disinfection of the Hands of Operator and Assistants.—Chief dependence on thorough

* Aseptic Surgical Technique: minimum requirements for aseptic surgical operating in a hospital in which the *personnel* of the operating room is permanent; June 14th, 1904. Albert J. Ochsner, of Chicago, Illinois.

washing in warm water with green soap, scrubbing with a brush, and the use of sterilised gauze to rub off loose epithelium. Great care is habitually taken never to touch septic cases with an uncovered hand. In addition the hands are soaked for a few moments in 1—2000 corrosive sublimate solution, and then in strong commercial alcohol.

Disinfection of Instruments.—All instruments, except knives, are boiled in soda solution both before and after operations. Knives are washed carefully with water and sterilised with alcohol. Silk, silkworm gut, horsehair, drainage tubes, etc., are likewise boiled for one hour and preserved in 1 in 20 carbolic or strong alcohol. Dressings, aprons, sheets, towels, etc., are disinfected in steam steriliser for two hours. Everything coming in contact directly with wounds, as basins, instrument pans, jars for dressings, are boiled in soda and water for one hour and wrapped up in sterilised sheets until used.

Pads of absorbent wool and of gauze sterilised as above are used as sponges. I saw no actual marine sponges in use anywhere. In Rochester there were some very satisfactory artificial sponges of wool and thick gauze, with tails to them, so that an end could always remain outside the abdomen, and thus there be no fear of leaving a sponge behind, avoiding the troublesome process of counting. I also observed no trouble about leaving instruments behind, all hæmostatic forceps used in this class of case having very long handles, which thus were never left or concealed inside the abdomen.

Catgut I observed everywhere used very extensively. Inside the abdomen it was used for all ligatures of vessels and pedicles and for suture material, except in operations of anastomosis of intestines, where either Pagenstecher's linen thread or silk was used. Catgut was generally used for the peritoneal and other buried sutures in the abdominal wall, continuous sutures being used. In varying way, silk-worm gut, silk or horsehair I saw used for the skin incisions; most commonly, I think, continuous silk. Catgut was sterilised, as a rule, with some impregnation of iodine, usually by processes taking many months. The process used at the Augustana Hospital was immersion in sulphuric ether for one month, then in strong commercial alcohol, in which one grain to the ounce of corrosive sublimate had been dissolved, for another month, the solution being renewed once during this month. It was preserved indefinitely in a solution of one part of sterilised iodoform, five parts of ether and fourteen parts of alcohol. It was claimed that this, according to its size, held for seven to ten days in the tissues. Chromicised catgut is used where a longer duration than this is required, as in herniæ.

The impression I formed was that catgut was looked upon as an important source of danger, but that its practical advantages for all kinds of buried sutures made its use essential. Samples of each manufacture should be tested always by cultivation.

Drainage.—Drainage I saw to be used much more extensively than I had expected, certainly to the extent which most of us in India use it, whilst at the same time making excuses for doing so, not feeling sufficient confidence in our system to trust it without

drainage. Amputations of large limbs, removals of breast with the pectoral muscles, are freely drained in several places for from two to four days. Ordinary indiarubber drainage tubes are used a good deal in the Augustana Hospital. Elsewhere I saw gauze drains, or the so-called cigarette drains (gauze surrounded by doubled gutta-percha tissue, which avoids the difficulty of gauze becoming adherent to the tissues) most frequently used. Once or twice only in abdominal cases did I see glass drainage tubes used, then iodoform gauze twigs were pushed down into the tube. In appendicitis cases particularly drainage was done more than I expected to see. In a few cases where the active inflammation around the appendix appeared to be of a very innocent character, a small cigarette drain was inserted. These drains are often kept in their place by suturing them to the tissues with silk or catgut.

As has been said, irrigation of wounds or of the abdominal cavity is practically never used. I saw no irrigators after the fashion we think necessary in new operation rooms in India in any of the operation rooms in America. Curettement of the uterus was done without irrigation actually in the operation room, dry applications only being used.

Dr. Ochsner believes that the only really serious risks are those of contact infection of the wounds, and that the actual weak spot is usually that the hands of the operator or assistants become fouled after the commencement of the operation.

On Tuesday, September 11th, I intended to attend the operations of Dr. McArthur, the surgeon-in-chief to the St. Luke's Hospital, who is held to be in the first rank of Chicago operating surgeons, but was unfortunately delayed and thus unable to stay but for a few minutes. The operation room at this hospital, though not very imposing or large, evidently saw the most rigid aseptic régime carried out; it was evident every detail was most thoroughly thought out, so that nothing that had not been completely sterilised should come in contact with the wounds. Operators, assistants, and nurses wore very complete sterilised uniforms, had regular gauze masks, which, as the temperature was about 90° in the shade, must have been very trying. They also wore special sterilised canvas shoes.

All I was able to see, however, was the completion of an operation for the radical cure of hernia, the only remarkable part being the use of living tendon, taken from the sides of the incision through the tendinous covering of the external oblique, to close the canal. Dr. McArthur said he had proof that such had actually continued to live and had not been simply absorbed.

Leaving this hospital I made a journey of some miles across Chicago to the Presbyterian Hospital which is connected with the Rush Medical College. One found in this neighbourhood a number of large buildings connected more or less with this college, such as the County Hospital and several scientific educational institutions. But, as stated before, it was impossible in the time at disposal to gain any effective knowledge of the educational institutions of Chicago, such as their relationship to universities, etc. As I have said, the celebrated introducer of the button in intestinal anastomosis, Dr. W. J. Murphy, whose reputation is world wide, attends the Presbyterian

Hospital on Tuesday mornings and usually gives informal clinical instruction. On this particular day (being in the vacation, very few students were present, but quite a number of medical men from distant places attended, amongst whom were five or six Britishers), Dr. Murphy was good enough to take one or two of those who had arrived first round his wards; he afterwards entered the operation theatre and discussed a number of surgical cases that were brought up for discussion as to treatment.

Dr. Murphy is evidently a very effective lecturer, and is naturally, from his work and position, authorised in being somewhat emphatic. Amongst the numerous points which he emphasised were the following:—

He strongly advocated the evacuation of cold abscesses and subsequent injection with a 2 per cent. solution of formalin in glycerin in preference to incision. In cases of a tubercular character he uses formalin and iodoform. He uses this treatment for tuberculous knees also. In fact, he caused great surprise in this way; it seemed that on this point his views were quite reactionary; for instance, in acute non-tuberculous septic arthritis of the knee he advocated repeated evacuation of pus with the aspirator rather than incision. In the same way he would treat empyæma, he would only operate by incision to drain a localised abscess of the lung. He showed in his wards many cases of arthritis of the knee of tubercular origin, which had been evacuated and this solution injected several times, and the results seemed to be good.

He made remarks about the treatment of septic peritonitis and acute appendicitis which showed, however, that in this class of disease he was with the most vehement advocates of early operation, not agreeing in the least with the views we had heard the day before expounded by Dr. Ochsner, who, as we have seen, believes in allowing the virulence of the septic organism to subside before interfering, when the infection is general. Dr. Murphy said that in these cases with definite acute onset, that is, so-called fulminating cases, perforation usually takes place thirty hours after commencement, and that a severe chill is a very frequent indication of perforation having taken place and of infection having become more or less generalised. He would prefer to operate before this, as he would thus be enabled to remove the seat of infection with a hope of leaving the general peritoneal cavity uninfected; but if not so fortunate he would, all the same, operate as soon as he saw the case, with the hope of removing a considerable part of the extravasated infected material and of giving exit to the products of inflammation by drainage. He claims better results than by the waiting for formation of localised abscess.

Another case of great interest was one of trophic ulcers of the leg, in which he had stretched the popliteal nerve. He said the results were very satisfactory. He has begun to stretch the brachial nerves supplying the affected fingers in Raynaud's disease.

Cases of cancer of the margin of the tongue and of the lip were shown for consultation. Amongst the remarks made on these was that soft ulcerating carcinomata in these regions point to rapid transmission, the glands becoming early infected; in the

opposite case, where induration is well marked, it points to a good fight against the enemy, the resistance being good. He thought resistance was mainly a personal matter, and not much dependent on the original nature of the growth. Dr. Murphy said we were not really justified in saying we should be more successful if operations on cancer were performed early, as regards the ultimate length of life, but he hoped the experiments now being made in so many parts of the world on mouse cancer would settle this. With regard to operations for epithelioma of the tongue, he said he was opposed to all operations from inside the mouth. It was gathered that he removed the tongue and the cervical glands at two operations, removing the tongue from the floor of the mouth through an incision immediately below the lower jaw.

He said the infected glands of epithelioma of the lower lip were small glands of wooden hardness; large œdematous glands were usually of mixed infection, and might not be infected with cancer at all.

A well-marked case of torticollis in a boy of seven or eight years of age was shown, and some very interesting remarks on the pathology of this affection made, giving the conclusion that as yet the true cause of the disease was not known. He favoured division of the sterno-cleido-mastoid simultaneously at both origin and insertion, the head being fixed in exaggerated lateral deviation towards the side of the affected muscle.

Another case was one in which large skin grafts on the leg had been made. In this the area grafted had been covered by a large shield on the same principle as the ordinary vaccination shield; the actual grafts were thus exposed dry to the air but protected against injury. For India one would suggest covering the shield with gauze to keep out flies. This treatment seems much better than the ordinary use of dressings, with the great danger of disturbing the graft when these have to be renewed.

Another case was one of fracture of the eleventh or twelfth dorsal or first lumbar vertebra from a squeeze between the buttocks and shoulders. The history pointed to injury to the nerve roots only, not to the spinal cord. In this case also the salient points of this class of injury with the means by which localisation after injury could be arrived at were very clearly pointed out, but necessarily these followed the text-books. Incidentally Dr. Murphy spoke of the union of divided nerves in old-standing cases, and said it was necessary to remove the thickened bulbous endings of the divided nerve, and to perform end-to-end union. I gathered he did not believe in the possibility of regeneration from lateral union.

The next morning, Wednesday, September 12th, I journeyed to the Mercy Hospital, of which I understood Dr. Murphy was the surgeon-in-chief, and in which he operated on practically all his private patients. It is a fine building in a quiet, middle-class neighbourhood, near the Indiana Avenue, being about half an hour by tramway from central Chicago. It is managed by a Roman Catholic sisterhood. The operating room is a very large one, giving sitting accommodation for one hundred or more visitors, each seat separate and flapping up. There is a thick marble low wall to separate arena from

seats, no visitors being allowed within arena. Walls of marble, but some ledges observable, furniture, tables, etc., covered with sterilised cloths and details much the same as described at the other clinics. Lighting seemed to be rather unsatisfactory, that is, the operations could not well be seen by the spectators if the natural light was made use of. A well-conceived electric light, however, was used, which followed the head of the operator round, being blackened on the aspect which would shine on his eyes. The usual dull white small octagonal tiles, well set, formed the floor. Indiarubber gloves and gauze helmets and respirators were used, but no special shoes. Anæsthetist was concealed behind a sheet covering patient's head, which made him look much like a photographer taking a photograph. His position could not have been a pleasant one, the day was very sultry, and it was difficult to see why he did not become anæsthetised himself.

The following was the list of operations for the day as displayed on the blackboard :—

1. Cholecystotomy.
2. Amputation of breast.
3. Cholecystotomy and appendicectomy.
4. Amputatio cervix uteri and anterior fixation.
5. Perineal prostatectomy.
6. Perineorrhaphy.
7. Aspiration of knee-joint.
8. Aspiration of thorax.
9. Injection of knee-joint.
10. Spinal injection.

In performing cholecystotomy Dr. Murphy made the usual linear incision in outer edge of right rectus muscle. The gall-bladder was carefully isolated by suture of its wall to the parietal peritoneum. He inspected the interior of the gall-bladder with an electric cystoscope. He drained with an indiarubber tube sewn to the edge of gall-bladder and abdominal incision. He said that in 86 per cent. of his earlier cases of operations for gall-stones there was no jaundice, in later cases this percentage was even higher. Dr. Murphy performs cholecystectomy only exceptionally ; cholecystotomy, when operating for gall-stones, was his usual operation.

The case of amputation of the breast was not of particular interest, the history rather pointed to the tumour being inflammatory, and on incision and removal this was confirmed, therefore simple removal of the breast only was practised ; but Dr. Murphy drew a diagram of the operation he performs for ordinary malignant growths in the female breast, from which it appeared that he makes a nearly horizontal incision commencing well above the anterior fold of the axilla connecting with an almost vertical incision internal to the nipple. He believes this incision, making a large skin flap, prevents cicatricial contraction in the axilla. It is, of course, drained by a button-hole incision. He puts up in a plaster of Paris shield, which supports the arm in an extended position.

Before commencing the next case, Dr. Murphy made remarks about the symptomatology of appendicitis and of gall-stone colic, showing that it was not always possible to differentiate them, especially to be sure about the concurrence of the two, one or other being fairly established. In this case the history of appendix trouble was clear and distinct. There had been several attacks. Some, however, of the later attacks from his history were suspected of being connected with the gall bladder.

At the operation appendicitis only was found, the appendix being constricted and much displaced at its middle point, a perforation with local inflammation having probably taken place in one of the earlier attacks. The actual operation was much the same as seen at Rochester: catgut purse-string suture around the base of the appendix, reduplicated over the mesenteric attachment, the mucous membrane being invaginated by means of a little rod dipped in pure carbolic acid. An outer row of Lembert's sutures further closed in the stump.

Amongst remarks made whilst completing this operation was one on the serious effects of peritoneal adhesions and contractions. Sometimes it would appear that the contents of the abdominal cavity would accommodate themselves without trouble to great distortions, whilst, at others, very little traction seems to give rise to pain and discomfort. Dr. Murphy said that the frequency of these troubles, though, perhaps, they were really small as regards their seriousness, greatly lowered the confidence of the public, and their readiness to submit to abdominal operations. He said that the covering of bare surfaces after intra-peritoneal operation should be invariably practised. To show the difficulty of removing such troubles by further operation, he instanced a patient of his, who appeared to have exceptional faith and perseverance, whose abdomen he had opened fourteen times to remove peritoneal adhesions; at the last operation he was successful in preventing fresh adhesion by filling the abdominal cavity with nitrogen gas.

In the case of amputation of the cervix, Dr. Murphy curetted the uterus first, using metallic branched dilators. He warned strongly against the use of sharp and big curettes, and said much injury has been done by excessive curetting. His operation for retroflexion which he performed on this case was somewhat allied to the interior Alexander, as performed by Dr. W. J. Mayo. He pulled the uterus forward, seized the round ligament some three inches outside the uterine cornu, and brought this point back to the fundus uteri, to which he sutured it at a point about half an inch internal to the cornual extremity. This of course was done on both sides, and naturally reduced the length of the round ligaments very considerably.

Dr. Murphy said he considered the ordinary (external) Alexander a good operation in the case of small retroflected nulliparous uteri, but in large multiparous uteri and those where there are inflammatory adhesions he considers it to be either useless or dangerous.

He objects to ventrofixation. He says the movements of the abdominal wall and pelvic floor are in opposition. This leads to the formation of bands and gives pain

until the band is fully extended and allows this movement, when there is danger in such bands. However, one must admit that one would like a little better assurance of the success of these internal shortenings of the round ligament.

Prostatectomy.—This was a very interesting operation, in view of the predilection of American surgeons generally for the perineal route in removal of enlarged prostates. As preliminary remarks Dr. Murphy said he performed the ventral operation for large tumours, and where calculi were present, but the perineal for small ones; he seemed at present to be undecided with regard to those of medium size, such as the case to be operated on. He said the mortality statistics were slightly against the suprapubic operation, but not sufficiently so for this to be a material point.* The chief point in favour of the perineal route was the greater comfort of the patient after the operation; he said advocates for the ventral route slurred over this point in their reports and remarked that, to people of refined habits, drainage of urine from the abdominal wound for two or three weeks was a very great trial and could not effectually be prevented by any form of dressing or drainage tubes. He admitted, however, that in the operation itself of perineal prostatectomy there was considerable danger of injuring the rectum, and further that there had, in his knowledge, been one or two cases of permanent perineal urinary fistulæ, *i.e.*, the completeness of the cure was not so assured, which statistics prove. The incision made was practically that for lateral lithotomy. A metal catheter also was kept in the urethra. The incision was, however, brought a little further back into the ischio-rectal fossa, than generally was done in lithotomy, in order to obtain more room. A finger was inserted into the rectum to warn of danger and to hitch that tube out of the way in deepening the incision.

The capsule of the gland when exposed freely was incised high up posteriorly, the finger inserted, and the gland detached as far as practicable from the capsule.

A good view was then obtained by strong retraction with rectangular retractors, and the gland removed in two separate halves by traction with a special hooked tractor and some slight aid with scissors. First the half to the operator's right hand was removed, and then that to the left. With the latter, a small œdematous third lobe came away. I think there was no doubt the prostatic urethra was opened up and at least its floor removed. The gland when brought together as would have been the case in nature was the size of a Tangerine orange.

It was said the patient would be made to sit up in bed almost at once, and the bladder would be drained by a tube for forty-eight hours. Dr. Murphy also said that if the patient needed it on account of collapse he would give continuous irrigation with saline solution into the rectum.

A very complicated case of serious rupture of the perineum combined with fæcal fistulæ and old syphilitic cicatrization was then submitted to operation. It showed considerable hopefulness or confidence to expect to obtain union under the unsatisfactory

* See *British Medical Journal*, paper by J. Lynn Thomas, p. 1264, November 10th, 1906.

septic conditions with which the operation started, but Dr. Murphy seemed to think that, perhaps, with a second subsidiary operation, he would eventually get a good result. The steps of the operation were necessarily not carried out on any recognised plan. The only points noticeable were that he used kangaroo tendon as sutures, which he said would last seventeen days. He also secured these by lead buttons and a lead strip. No irrigation of any kind was used in this operation.

The remaining cases on the list were more or less cases under treatment by repeated aspiration or injection; the principle on which they were treated has been referred to before.

One case was brought in for inspection which was not on the list of operations, viz., an amputation of the forearm which had been performed three or four days before and was doing well; this was remarkable for having been effected practically through damaged tissue and well below the seat of a fracture of both radius and ulna, the limit of undamaged skin having been taken almost as the seat of section of the bones. One noticed that through-and-through drainage by a tube had been effected, and that the wound was covered by a powder which Dr. Murphy uses extensively over wounds, viz., sub-iodide of mercury, a brick-red-coloured powder, that certainly does not add to the appearance of wounds. One had hardly expected to find such a treatment, which one had believed was now very much on the wane.

The last case brought in was in some ways the most interesting as showing a treatment which, if not original, yet appeared to be unknown to all the visitors present. I did not gather whether Dr. Murphy claimed this as his own idea or whether he had adopted it on someone else's suggestion. I have not, at the time of writing, access to literature sufficient to find out whether this has been referred to in surgical literature. The case was that of a young girl of about six or seven years of age who had been the subject of most troublesome nocturnal enuresis. She had been subjected to the treatment by injection of cocain solution into the sacral canal. Four or five such injections had been made at intervals of four or five days, and already the trouble had been controlled, but usually six or eight injections are required. Dr. Murphy said that up to the present he had found this a certain cure, and, so far as could be said in the time, a permanent one. He uses a specially constructed trocar syringe of a proper curve and diameter which he enters between the two little projections which denote the end of the sacral canal. It works its way up the sacral canal, and the solution is injected amongst the nerve roots of the cauda.

The solution actually used is the following :—

Cocain, $\frac{3}{4}$ grain ;

Sodii chloridi, 6 grains ;

Aquam, 100 minims.

Of this ℥ 15 is injected the first day. The next day ℥ 15 with ℥ 30 of water is injected. In further injections the quantity of water is increased but not the quantity of cocain.

Dr. Murphy believes it is the injection of fluid which effects the cure, and not the cocain, which is useful only to allay any pain which may be caused.

It may be added that here catgut rendered aseptic, by a process by which it is iodised, is used as in the other clinics, for nearly all buried or concealed ligatures and sutures. Abdominal incisions are united by continuous sutures with catgut for peritoneum, whilst interrupted silk sutures are used for skin and muscles.

At Rochester one noticed more than in the clinics visited at Chicago that the peritoneum was separated from the superjacent tissues to some distance on either side of the line of incision, the continuous suture taking up a considerable margin from either side, starting well below and ending well above the extremities of the incision.

PART IV.

UNITED STATES.

BALTIMORE.

ON the evening of Wednesday, September 12th, we left Chicago by the New York express on the Baltimore and Ohio Railway, with the intention of stopping both at Washington and Baltimore. Washington was reached in twenty-four hours after passing through the interesting Pennsylvania steel centre, Pittsburg, and crossing a part of the celebrated Alleghany mountains. A few hours' stay in Washington was sufficient to inspect the Capitol and the world-famous Congressional Library, an extraordinarily fine building, and to observe generally the numerous Government secretarial buildings and the modest residence of the President, the White House. Baltimore was reached rather late at night on September 13th.

Baltimore is a pleasant and clean city, being, of course, of much older origin and slower growth than Chicago. It is therefore not blessed(?) with the extreme regularity of that town, but it is much cleaner, and although the houses are much less lofty, yet it is altogether a pleasanter city, the streets being much better kept. It was, however, at the time I was there very hot. A temperature of 88° Fahr. at eight o'clock in the evening inside the railway station showed what it can be in America in early September. It must be remembered, however, that Maryland may almost be considered a Southern State. In the hotel in which I stayed mosquito nets were provided in the bedrooms, and were very necessary, as clouds of mosquitoes made their appearance at night; they seemed to be, from casual inspection, a large variety of *Cullex*.

The morning of Friday, September 14th, was devoted to a visit to the Johns Hopkins Hospital, which is so well known in Europe, not only on account of the reports of its structural magnificence, but from the scientific work which has emanated from the members of its staff. Its position apparently has been such that it has been able to attract, both on account of its financial resources and the renown attained by its *alumni*, the best scientific talent in medicine in America. When a few of the names connected with this hospital are noted it will be seen that practically all its senior staff are men whose names are household words amongst the profession throughout the

civilised world. Professor Osler, now of Oxford, everybody knows, was until recently the principal of this hospital. Halsted, whose work on breast operations for cancer and in operations for the radical cure of hernia is so famous, is the head of the surgical department; one of his juniors, Finney, is even now well known to surgical specialists by his work on Pyloroplasty. Howard Kelly is perhaps better known in Europe than he is in America—he is the director of the gynæcological department; whilst Whitridge Williams, considered one of the chief authorities on midwifery and the writer of one of the best modern text-books on that subject and the performer of many thoroughly original bacteriological inquiries into puerperal sepsis, is the head of the obstetrical department. Welch and Thayer are physicians and pathologists almost equally well known. Many of the juniors also are well known in the special branches to which they devote their attention.

As a matter of fact, I was not very successful in being able to actually follow the work of any of the above men, the usual difficulties of meeting celebrities during the vacation being met with here much more than elsewhere, nearly all the heads of departments being away on holidays, but for such a short visit it would have been impossible to see much in addition to surveying the hospital generally, which, of course, we had an excellent opportunity of doing.

The Johns Hopkins Hospital was built some fifteen or twenty years ago, apparently without regard to the money question, and is really a great institution, probably unique in its architectural magnificence and pleasant surroundings. It occupies a site of fifteen acres in a pleasant part of the city, and is built on the pavilion or separate connected building plan on two sides of a square, the remaining portion of the enclosure being a pleasant small park with shelter houses and nice walks.

The principal entrance is into the central of three buildings on one of the sides of the square. This building is a very fine one, with spacious board rooms, offices, etc., and a big hall with a large sculpture dominating the entrance. On either side of this building are two hospitals for private paying patients, showing that it is possible to associate private and public hospitals.

The public hospital buildings are situated on the other occupied side of the square; out-patient departments are on the ground floor opening to the street, the in-patient wards on the first and second floors, practically unconnected with the ground floor. The buildings are devoted to separate departments—medicine, surgery, obstetrics; there is also an infectious diseases building. The broad covered-in ways which connect the separate pavilions both on the ground and second floors finish up by leading to the pathological department, which is a compact but very completely equipped separate building.

The number of beds, considering the size of the whole establishment, is not large compared with the large London hospitals—I believe only about 300—but it appears that an amount of clinical material of great interest is passed through its wards quite equalling that of much larger institutions. It would seem from reading the report that

the object of the hospital is rather more the advancement of medical science than of directly ministering to the needs of the largest number of sick possible; it was understood there are many other hospitals in Baltimore who are expected to meet these wants.

The medical pavilion had several wards on rather an unusual plan—the rooms were polygonal in shape, with central heating and ventilating arrangements. It certainly was rather a strange arrangement; the appearance of all the patients' feet pointing towards one on attaining the centre of the ward is very curious. Throughout the hospital all the arrangements, such as lifts and connections with the various administrative depots, seemed to be very complete and well thought out, though it must be admitted the distances seemed to be enormous.

The operating and sterilising rooms are on an upper floor of the surgical block, but patients can be easily brought on their beds to this floor in suitable lifts. The rooms are very extensive, but after all nothing essentially different from what one sees elsewhere. Marble is used very extensively for walls; floors are of the usual small, rather dull tiles; arena separated from auditorium by a thick marble low wall. The seated area was constructed of metal, and arranged so that it could be thoroughly washed by mechanical means with disinfectants, the floor being on one slope with separate foot-rests.

The system carried out in this institution is rather antiseptic than aseptic surgery; it was said they obtained such excellent results from this system, which had been elaborated by Professor Halsted some fifteen to twenty years ago, that, although allowing equally good results were obtained from a system where antiseptics are not used, yet they saw no reason to change, as there was little more to be expected in the way of improved results. The difference in the method, however, in the two operations I saw performed was not very appreciable, a little more use of disinfecting solutions during the operation and the use of antiseptic dressings being as far as I could see the only difference in technique from what I had seen. The general principles seemed to be much the same as those with which the surgeon in India works when he cannot be certain of the means at his disposal for rendering all his materials sterile.

In the surgical operation room I saw Dr. Finney, who was in charge of the surgical department in the absence of Professor Halsted, do a sequestrotomy. An X-ray photograph had been taken, and was shown at the time of the operation to aid in the steps of the operation.

The other operation he performed was of greater interest. There had been admitted, only a few minutes before the arrival of the surgeon to perform the above operation, a young man who had the appearance of being very gravely ill. A very little examination was sufficient to convince anyone that it was a case of fulminating appendicitis. I was much struck with the attitude of this man, a better class workman, and of the clergyman who had come with him. Dr. Finney simply said to him, "You have to be operated on at once." The only reply he received was that this was what he, the patient

had come for ; neither he nor the clergyman asked whether it would not be possible to do without it or suggested that they would like to wait and think it over. No doubt he had been sent in by a practitioner who had seen him outside, but even then it was evident the practitioner was much more decided than the general practitioner in England would be.

Whilst the other operation was proceeding this patient was made ready, and a blood count was made. It turned out there were 22,000 white cells per cubic mm. On opening the abdomen an acutely inflamed gangrenous appendix was found, and there was a perforation through which a considerable sized concretion had passed. There was a virulent type of inflammation of the peritoneum over an extensive area starting from the appendix, the intestines being covered with a mortary white coating. Much sero-purulent fluid was found in the pelvis, which was mopped out thoroughly. Very complete drainage of the lower part of the peritoneal cavity and of the neighbourhood of the appendix was effected, but the cavity was not washed out, the view that this would tend to extend the virulent inflammation to the upper part of the cavity being accepted.

I also saw in the gynæcological operating room, which is in another building, a portion of an operation for fibroids by hysterectomy in a large negress. The operation was performed by Dr. Rushman, assistant gynæcologist. He, as seems to be usual, removed the appendix as well, the only special point about his technique in doing this was that he touched the stump with the actual cautery before invaginating it. He used the usual purse-string suture.

In suturing the abdominal incisions he used a catgut subcuticular continuous suture, in addition to the usual peritoneal continued suture. He dressed the wound with sterilised silver leaf and tissue paper. Over this he placed dry absorbent wool.

I thought the gynæcological operation room was rather dark and dingy, and was rather surprised at this, as it is the room in which Kelly has done his work.

Immediately after leaving the Johns Hopkins Hospital I went to the station and left for New York, from whence I sailed the next day for England by the Cunard liner *Campania*, thus completing a very interesting month in Canada and the United States.

PART V.

SOME GENERAL IMPRESSIONS.

THE general impression I formed of the medical profession and of medical work in both Canada and the United States was, on the whole, a very favourable one, although I have not thought it desirable to make much of what I thought open to criticism. The *personnel* of the profession in Canada, if it gave the impression that it is a long way behind what in England in mannerisms and conduct is thought to denote refinement and general good tone, yet is unquestionably manly and independent, and the standard of professional attainments a high one. Judging from the large number of practitioners from the States I met attending the clinics both at Rochester and at Chicago, the same remarks would apparently apply to the average practitioner in the States, but not to the heads of the profession, who, if they have discarded the old-fashioned air of omniscience which yet in England cannot altogether be thrown aside by the faculty, yet in ease and polish would, I think, at least hold their own in comparison with the leaders of the profession in England. As to the work, it will have been seen that I was very favourably impressed indeed with regard both to its boldness, and the excellence of the system on which it depends for its great success. There seemed to be a general feeling that every procedure had to pass a rigid examination as to its usefulness, nothing being adhered to because it was customary so to do, or because it had been handed down from great masters of former generations. It was also evident that the best work was being done by men in the prime of life, all the operators I saw being men of about forty years of age. Especially after hearing the discussions in the sections of surgery and gynæcology at Toronto, I formed the opinion, as most Englishmen have, that all that our American brethren write and assert must not be taken for gospel truth, but although perhaps this was not altogether dissipated, yet I came to the conclusion that their actual practice is much less advanced than their writings and speeches lead one to believe. In fact, with regard to some of their proceedings they distinctly seemed to be retrogressive. I would instance the view expressed on the operative treatment of cases of cancer, and especially with regard to Dr. Murphy's treatment of knee-joint cases and empyema by aspiration. Another point which was remarkable was the apparent extension of the boundaries of surgical work as practised in the private

hospitals. The general surgeon takes up pelvic cases in females as a matter of course, including minor gynæcological vaginal operations. Apparently he does not acknowledge the right of specialists in this line.

There is a most striking difference between the way in which private surgical work is carried on in America and in England. The resort to private hospitals or the paying portions of public hospitals seems to be the universal rule when well-to-do people require surgical treatment. It is altogether a different system to that of going to nursing homes, as in London and other large English towns, and even to that extant on the Continent.

The most advanced examples of private hospitals which I saw were the St. Mary's Hospital at Rochester, and the Augustana and Mercy Hospitals in Chicago. These are large specially built institutions, with every modern convenience, and have nothing in common with the nursing homes in England, or the Policliniks in Germany, which are almost invariably converted private dwelling-houses. The number of beds provided is from 150 to 200 in each of them, and the surgical equipment is of the most advanced and complete character.

The advantages of institutions of this kind, where the system is under the control of one man, all the assistants practically being his servants, and subject to very infrequent changes, is manifest. It was evident that not only is it possible for one man to perform a much larger number of operations in the year, but it leads most certainly to better results. It has been shown that the report of the St. Mary's Hospital at Rochester claims a performance of 3,000 operations per annum. There was ample evidence that at both the hospitals just referred to in Chicago nearly an equal amount of work was performed, and it is admitted by all that the results are hardly equalled anywhere else. I much regretted I was unable thoroughly to understand the more intimate business relationships of these institutions. I could not learn, for instance, from what funds these institutions had been built, though I gathered generally that the surgeon had no great monetary interest in them, that they were mostly managed by some religious body, who provided the matron and nurses, and that they were self-supporting, the fees paid by the patients meeting the expenses.

The fees which are paid separately for the treatment received are graduated according to the means of the patient ; in America even the most eminent surgeons will operate on classes only just above the working classes for quite small fees, abuse of free hospitals in this way being much less, I was told, than in England.

One Chicago surgeon of eminence told me he had not operated in a private house more than twice in the previous six months.

The visit was altogether a most instructive one, and, I think, is an experience which would tend with most to enlarge the ideas and to take one out of beaten tracks of thought. Altogether I can strongly advise my professional brethren in India to give a consideration to the usefulness of passing a month or two in North America as a way of spending part of their furlough. It is certain they will be received with the greatest of

courtesy, and it will be felt as an honour by the profession in America, who feel very much the apparent neglect of their work by the English profession, so very few of whom have ever visited the States; in Canada even more would they be received with accord. It must be said, however, that professionally in Canada they would only be seeing the work at second hand, as practice there is much more governed by American models than it is influenced from England or is original. For sight-seeing purposes it would be best undoubtedly from India to journey *viâ* Japan and British Columbia, going by the Canadian Pacific Railway Company's service, and from thence to follow the route sketched out in this paper, that is, after visiting the Rocky Mountains to go to Chicago. From thence it is convenient to go north-east again to Toronto, Montreal, and Quebec, turning south into the States from the latter city to reach the older-established cities on the Atlantic seaboard. These lie within an easy distance of one another, New York being very central. If the visit is intended to be purely professional, then San Francisco is a better port of entry, leaving Canada out of the visit altogether. It would, however, be a pity to visit the American continent without seeing something of the older part of the Dominion of Canada. The combined historical and natural interest of Montreal and Quebec, especially the latter, should not lightly be passed by. It should, however, be added that living, if not actual railway travelling, is considerably dearer in both the United States and Canada than it is in England or in Europe. One's expenses must be estimated at about twice what one would spend in travelling in Europe, but to those who are not accomplished linguists the advantage of being in a country where the same tongue is spoken is felt to be very great, especially in allowing one to reap the greatest advantage possible from visits to the various clinics. It may be said also that one sees very little signs of it being a general practice to overcharge strangers, which certainly cannot be said of London in regard to Americans visiting that city.

One could not help, from unconscious remarks both of Canadian and American people, soon finding out that in both countries they have a fixed belief that England is an old non-progressive country where everything, both in the medical profession and otherwise, is half a century behind the times. If in a few ways, particularly in the much less general use of electric power and telephones and of mechanical devices, this is unquestionably true, yet in many others, and those which we consider of vastly greater importance, the newer cities of Canada and Western America are even more backward, and are kept backward largely from this idea that they have nothing to learn. I do not think this idea of the backwardness of Europe is so largely prevalent amongst Americans who have travelled, though I did hear one travelled surgeon express himself in very disparaging terms of the surgical talent in London.



